𝓑𝓮 #11

PCT09

RAW SEQUENCE LISTING   DATE: 02/06/2002
PATENT APPLICATION: US/09/674,337A   TIME: 14:15:13

Input Set : A:\55107sequence.txt
Output Set: N:\CRF3\02062002\I674337A.raw

P⁵

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 4 <110> APPLICANT: Satoshi MORI
 5        Kyoko Higuchi
 7 <120> TITLE OF INVENTION: NICOTIANAMINE SYNTHASE AND GENE ENCODING
 8        THE SAME
10 <130> FILE REFERENCE: 55107 (71526)
12 <140> CURRENT APPLICATION NUMBER: 09/674,337A
13 <141> CURRENT FILING DATE: 2002-01-07
15 <150> PRIOR APPLICATION NUMBER: PCT/JP99/02305
16 <151> PRIOR FILING DATE: 1999-04-30
18 <160> NUMBER OF SEQ ID NOS: 22
20 <170> SOFTWARE: FastSEQ for Windows Version 3.0
22 <210> SEQ ID NO: 1
23 <211> LENGTH: 328
24 <212> TYPE: PRT
25 <213> ORGANISM: Hordeum vulgare L.
27 <400> SEQUENCE: 1
28  Met Asp Ala Gln Asn Lys Glu Val Ala Ala Leu Ile Glu Lys Ile Ala
29   1               5                  10                  15
30  Gly Ile Gln Ala Ala Ile Ala Glu Leu Pro Ser Leu Ser Pro Ser Pro
31                  20                  25                  30
32  Glu Val Asp Arg Leu Phe Thr Asp Leu Val Thr Ala Cys Val Pro Pro
33                  35                  40                  45
34  Ser Pro Val Asp Val Thr Lys Leu Ser Pro Glu His Gln Arg Met Arg
35          50                  55                  60
36  Glu Ala Leu Ile Arg Leu Cys Ser Ala Ala Glu Gly Lys Leu Glu Ala
37  65                  70                  75                  80
38  His Tyr Ala Asp Leu Leu Ala Thr Phe Asp Asn Pro Leu Asp His Leu
39                  85                  90                  95
40  Gly Leu Phe Pro Tyr Tyr Ser Asn Tyr Val Asn Leu Ser Arg Leu Glu
41                  100                 105                 110
42  Tyr Glu Leu Leu Ala Arg His Val Pro Gly Ile Ala Pro Ala Arg Val
43          115                 120                 125
44  Ala Phe Val Gly Ser Gly Pro Leu Pro Phe Ser Ser Leu Val Leu Ala
45          130                 135                 140
46  Ala His His Leu Pro Glu Thr Gln Phe Asp Asn Tyr Asp Leu Cys Gly
47  145                 150                 155                 160
48  Ala Ala Asn Glu Arg Ala Arg Lys Leu Phe Gly Ala Thr Ala Asp Gly
49                  165                 170                 175
50  Val Gly Ala Arg Met Ser Phe His Thr Ala Asp Val Ala Asp Leu Thr
51                  180                 185                 190
52  Gln Glu Leu Gly Ala Tyr Asp Val Val Phe Leu Ala Ala Leu Val Gly
53                  195                 200                 205
54  Met Ala Ala Glu Glu Lys Ala Lys Val Ile Ala His Leu Gly Ala His
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55       210                    215                   220
56   Met Val Glu Gly Ala Ser Leu Val Val Arg Ser Ala Arg Pro Arg Gly
57   225                    230                   235                   240
58   Phe Leu Tyr Pro Ile Val Asp Pro Glu Asp Ile Arg Arg Gly Gly Phe
59                      245 ·                   250                   255
60   Glu Val Leu Ala Val His His Pro Glu Gly Glu Val Ile Asn Ser Val
61                      260                   265                   270
62   Ile Val Ala Arg Lys Ala Val Glu Ala Gln Leu Ser Gly Pro Gln Asn
63            275                    280                   285
64   Gly Asp Ala His Ala Arg Gly Ala Val Pro Leu Val Ser Pro Pro Cys
65       290                    295                   300
66   Asn Phe Ser Thr Lys Met Glu Ala Ser Ala Leu Glu Lys Ser Glu Glu
67   305                    310                   315                   320
68   Leu Thr Ala Lys Glu Leu Ala Phe
69                      325
71  <210> SEQ ID NO: 2
72  <211> LENGTH: 1295
73  <212> TYPE: DNA
74  <213> ORGANISM: Hordeum vulgare L.
76  <400> SEQUENCE: 2
77   gcgttcagag gcttccagag ttcttccggt caccaagaag catttgatca taacatggat      60
78   gcccagaaca aggaggtcgc tgctctgatc gagaagatcg ccggtatcca ggccgccatc     120
79   gccgagctgc cgtcgctgag cccgtccccc gaggtcgaca ggctcttcac cgacctcgtc     180
80   acggcctgcg tcccgccgag ccccgtcgac gtgacgaagc tcagcccgga gcaccagagg     240
81   atgcgggagg ctctcatccg cttgtgctcc gccgccgagg ggaagctcga ggcgcactac     300
82   gccgacctgc tcgccacctt cgacaacccg ctcgaccacc tcggcctctt cccgtactac     360
83   agcaactacg tcaacctcag caggctggag tacgagctcc tggcgcgcca cgtgccgggc     420
84   atcgcgccgg cgcgcgtcgc cttcgtcggc tccggcccgc tgccgttcag ctcgctcgtc     480
85   ctcgccgcgc accacctgcc cgagacccag ttcgacaact acgacctgtg cggcgcggcc     540
86   aacgagcgcg ccaggaagct gttcggcgcg acggcggacg gcgtcggcgc gcgtatgtcg     600
87   ttccacacgg cggacgtcgc cgacctcacc caggagctcg gcgcctacga cgtggtcttc     660
88   ctcgccgcgc tcgtcggcat ggcagccgag gagaaggcca aggtgattgc ccacctgggc     720
89   gcgcacatgg tggagggggc gtccctggtc gtgcggagcg cacggccccg cggctttctt     780
90   taccccattg tcgacccgga ggacatcagg cggggtgggt tcgaggtgct ggccgtgcac     840
91   cacccggaag gtgaggtgat caactctgtc atcgtcgccc gtaaggccgt cgaagcgcag     900
92   ctcagtgggc cgcagaacgg agacgcgcac gcacggggcg cggtgccgtt ggtcagcccg     960
93   ccatgcaact tctccaccaa gatggaggcg agcgcgcttg agaagagcga ggagctgacc    1020
94   gccaaagagc tggccttttg attgaagagt gcgcgtggtc attctgtcgc ctgcgatcgt    1080
95   ggtaactttc ctactcgtgt gtgttttgat gtttgtgcct gtaagagtta tgcttccggc    1140
96   cttgtgctgt taatttacac gcgttacatg tagtacttgt atttatacct ggaataacgg    1200
97   tatgtaacat aaatattagt gggatttgaa gtgtaatgct aaataataag aaaacttgat    1260
98   gcagacattc aaaaaaaaaa aaaaaaaaaa aaaaa                               1295
100 <210> SEQ ID NO: 3
101 <211> LENGTH: 335
102 <212> TYPE: PRT
103 <213> ORGANISM: Hordeum vulgare L.
105 <400> SEQUENCE: 3
106  Met Ala Ala Gln Asn Asn Gln Glu Val Asp Ala Leu Val Glu Lys Ile
107  1                    5                   10                   15
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Input Set : A:\55107sequence.txt
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```
108    Thr Gly Leu His Ala Ala Ile Ala Lys Leu Pro Ser Leu Ser Pro Ser
109                20                  25                  30
110    Pro Asp Val Asp Ala Leu Phe Thr Glu Leu Val Thr Ala Cys Val Pro
111                35                  40                  45
112    Pro Ser Pro Val Asp Val Thr Lys Leu Gly Pro Glu Ala Gln Glu Met
113        50                  55                  60
114    Arg Glu Gly Leu Ile Arg Leu Cys Ser Glu Ala Glu Gly Lys Leu Glu
115    65                  70                  75                  80
116    Ala His Tyr Ser Asp Met Leu Ala Ala Phe Asp Lys Pro Leu Asp His
117                85                  90                  95
118    Leu Gly Met Phe Pro Tyr Tyr Asn Asn Tyr Ile Asn Leu Ser Lys Leu
119                100                 105                 110
120    Glu Tyr Glu Leu Leu Ala Arg Tyr Val Pro Gly Gly Tyr Arg Pro Ala
121                115                 120                 125
122    Arg Val Ala Phe Ile Gly Ser Gly Pro Leu Pro Phe Ser Ser Phe Val
123        130                 135                 140
124    Leu Ala Ala Arg His Leu Pro Asp Thr Met Phe Asp Asn Tyr Asp Leu
125    145                 150                 155                 160
126    Cys Gly Ala Ala Asn Asp Arg Ala Ser Lys Leu Phe Arg Ala Asp Arg
127                165                 170                 175
128    Asp Val Gly Ala Arg Met Ser Phe His Thr Ala Asp Val Ala Asp Leu
129                180                 185                 190
130    Ala Gly Glu Leu Ala Lys Tyr Asp Val Val Phe Leu Ala Ala Leu Val
131                195                 200                 205
132    Gly Met Ala Ala Glu Asp Lys Ala Lys Val Ile Ala His Leu Gly Ala
133        210                 215                 220
134    His Met Ala Asp Gly Ala Ala Leu Val Val Arg Ser Ala His Gly Ala
135    225                 230                 235                 240
136    Arg Gly Phe Leu Tyr Pro Ile Val Asp Pro Gln Asp Ile Gly Arg Gly
137                245                 250                 255
138    Gly Phe Glu Val Leu Ala Val Cys His Pro Asp Asp Asp Val Val Asn
139                260                 265                 270
140    Ser Val Ile Ile Ala Gln Lys Ser Lys Asp Val His Ala Asp Gly Leu
141                275                 280                 285
142    Gly Ser Gly Arg Gly Ala Gly Gly Gln Tyr Ala Arg Gly Thr Val Pro
143        290                 295                 300
144    Val Val Ser Pro Pro Cys Arg Phe Gly Glu Met Val Ala Asp Val Thr
145    305                 310                 315                 320
146    Gln Asn His Lys Arg Asp Glu Phe Ala Asn Ala Glu Val Ala Phe
147                325                 330                 335
149 <210> SEQ ID NO: 4
150 <211> LENGTH: 1342
151 <212> TYPE: DNA
152 <213> ORGANISM: Hordeum vulgare L.
154 <400> SEQUENCE: 4
155  ctcctgtgcc tgtcctgagg taccaagaac accagtgaaa tggctgccca gaacaaccag      60
156  gaggtggatg ccctggtgga gaagatcacc gggctccatg ccgcaatcgc caagctgccg     120
157  tcgctcagcc catccccgga cgtcgacgcg ctcttcacgg agctggtcac ggcgtgcgtt     180
158  ccaccgagtc cagtggacgt gaccaagctc gggccggagg cgcaggagat gcgggagggc     240
```

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PATENT APPLICATION: US/09/674,337A   TIME: 14:15:13

Input Set : A:\55107sequence.txt
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159   ctcatccgcc tatgctccga ggccgagggg aagctggagg cgcactactc cgacatgctc      300
160   gccgccttcg acaagccgct ggatcacctc ggcatgttcc cctactacaa caactacatc      360
161   aacctcagca agctcgagta cgagctcctg gcccgctacg tgcctggcgg ctatcgcccg      420
162   gcgcgcgtcg cgttcatcgg ctccggcccg ctgccgttca gctcctttgt cctggccgcg      480
163   cgccacctgc ccgacaccat gttcgacaac tatgacctgt gcggtgcggc caacgatcgc      540
164   gccagcaagc tcttccgcgc ggatcgcgac gtgggtgccc gcatgtcgtt ccacacggcc      600
165   gacgtcgcgg acctcgccgg cgagctcgcc aagtacgacg ttgtcttcct ggccgcactc      660
166   gtcggcatgg ccgccgagga caaggcgaag gtgatcgcgc acctcggcgc acacatggca      720
167   gacggggcgg ccctcgtcgt gcgcagcgca cacggagcgc gcgggttcct gtacccgatc      780
168   gtcgacccc aggacatcgg ccgaggcggg ttcgaggtgc tggccgtgtg ccatcccgac      840
169   gacgacgtgg tgaactccgt catcatcgca cagaagtcca aggacgtgca tgccgatgga      900
170   cttggcagcg ggcgtggtgc cggtggacag tacgcgcggg gcacggtgcc tgttgtcagc      960
171   cccccgtgca ggttcggcga gatggtggcg gacgtgaccc agaaccacaa gagagacgag     1020
172   tttgccaacg ccgaagtggc cttttgatcg ttcgctgcga gggtgtgcat ccatgatcca     1080
173   tccatacctc gttctgtgat tgcatcaagc ttgcaatcgt atgcatttca agtcacgtgt     1140
174   tgcttctatc caataatgta cgtgtggtgt ttacacgcga atgtcttgta gacctttgta     1200
175   tgtgtacaag tgaattttaa ttcacaagta catataatgg tcaccattga aaagatgttt     1260
176   agtgtgtgtt ttccaatata tgtttgtgta aggttcatca tctaataaaa.tatgtttgga     1320
177   acccaaaaaa aaaaaaaaaa aa                                             1342
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179 <210> SEQ ID NO: 5
180 <211> LENGTH: 335
181 <212> TYPE: PRT
182 <213> ORGANISM: Hordeum vulgare L.

184 <400> SEQUENCE: 5
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185   Met Ala Ala Gln Asn Asn Asn Lys Asp Val Ala Ala Leu Val Glu Lys
186    1               5                  10                  15
187   Ile Thr Gly Leu His Ala Ala Ile Ala Lys Leu Pro Ser Leu Ser Pro
188                  20                  25                  30
189   Ser Pro Asp Val Asp Ala Leu Phe Thr Glu Leu Val Thr Ala Cys Val
190                  35                  40                  45
191   Pro Pro Ser Pro Val Asp Val Thr Lys Leu Gly Pro Glu Ala Gln Glu
192          50                  55                  60
193   Met Arg Glu Gly Leu Ile Arg Leu Cys Ser Glu Ala Glu Gly Lys Leu
194   65                  70                  75                  80
195   Glu Ala His Tyr Ser Asp Met Leu Ala Ala Phe Asp Asn Pro Leu Asp
196                  85                  90                  95
197   His Leu Gly Ile Phe Pro Tyr Tyr Ser Asn Tyr Ile Asn Leu Ser Lys
198                  100                 105                 110
199   Leu Glu Tyr Glu Leu Leu Ala Arg Tyr Val Arg Arg His Arg Pro Ala
200          115                 120                 125
201   Arg Val Ala Phe Ile Gly Ser Gly Pro Leu Pro Phe Ser Ser Phe Val
202          130                 135                 140
203   Leu Ala Ala Arg His Leu Pro Asp Thr Met Phe Asp Asn Tyr Asp Leu
204   145                 150                 155                 160
205   Cys Gly Ala Ala Asn Asp Arg Ala Ser Lys Leu Phe Arg Ala Asp Thr
206                  165                 170                 175
207   Asp Val Gly Ala Arg Met Ser Phe His Thr Ala Asp Val Ala Asp Leu
208                  180                 185                 190
209   Ala Ser Glu Leu Ala Lys Tyr Asp Val Val Phe Leu Ala Ala Leu Val
```

```
210          195                 200                 205
211  Gly Met Ala Ala Glu Asp Lys Ala Lys Val Ile Ala His Leu Gly Ala
212      210                 215             220
213  His Met Ala Asp Gly Ala Ala Leu Val Val Arg Ser Ala His Gly Ala
214  225                 230             235                 240
215  Arg Gly Phe Leu Tyr Pro Ile Val Asp Pro Gln Asp Ile Gly Arg Gly
216                 245             250                 255
217  Gly Phe Glu Val Leu Ala Val Cys His Pro Asp Asp Asp Val Asn
218              260             265                 270
219  Ser Val Ile Ile Ala Gln Lys Ser Lys Glu Val His Ala Asp Gly Leu
220          275             280                 285
221  Gly Ser Ala Arg Gly Ala Gly Arg Gln Tyr Ala Arg Gly Thr Val Pro
222      290             295                 300
223  Val Val Ser Pro Pro Cys Arg Phe Gly Glu Met Val Ala Asp Val Thr
224  305                 310             315                 320
225  Gln Asn His Lys Arg Asp Glu Phe Ala Asn Ala Glu Val Ala Phe
226              325             330                 335
228  <210> SEQ ID NO: 6
229  <211> LENGTH: 1314
230  <212> TYPE: DNA
231  <213> ORGANISM: Hordeum vulgare L.
233  <400> SEQUENCE: 6
234   ctacttcact cacactagtg cccagaaaga aggctgcaat ggctgcccag aacaacaaca     60
235   aggatgtcgc tgccctggtg gagaagatca ccgggctcca cgccgccatc gccaagctgc    120
236   cgtcgctcag cccatccccg gacgtcgacg cgctcttcac cgagctggtc acggcgtgcg    180
237   ttcccccgag ccccgtggac gtgaccaagc tcggccccga ggcgcaggag atgcgggagg    240
238   gcctcatccg cctctgctcc gaggccgagg ggaagctgga ggcgcactac tccgacatgc    300
239   tcgccgcctt cgacaacccg ctggatcacc tcggcatctt cccctactac agcaactaca    360
240   tcaacctcag caagctggag tacgagctcc tggcacgcta cgtccggcgg catcgcccgg    420
241   cccgcgtcgc gttcatcggc tccggcccgc tgccgttcag ctcctttgtc ctggccgcgc    480
242   gccacctgcc cgacaccatg tttgacaact acgacctttg cggcgcggcc aacgatcgcg    540
243   ccagcaagct cttccgcgcg gacacggacg tgggtgcccg catgtcgttc cacacggccg    600
244   acgtcgcgga cctcgccagc gagctcgcca agtacgacgt cgtcttcctg gccgcgctcg    660
245   tcggcatggc cgccgaggac aaggccaagg tgatcgcgca cctcggcgca cacatggcag    720
246   acggggcggc cctcgtcgtg cgcagcgcac acggagcgcg cgggttcctg tacccgattg    780
247   tcgaccccca ggacatcggc cgcggcgggt tcgaggtgct ggccgtgtgc caccccgacg    840
248   acgacgtggt gaactccgtc atcatcgcac agaagtccaa ggaggtgcat gccgatggac    900
249   ttggcagcgc gcgtggtgcc ggtcgacagt acgcgcgcgg cacggtgccg gttgtcagcc    960
250   ccccgtgcag gttcggtgag atggtggcgg atgtgaccca gaaccacaag agagacgagt   1020
251   ttgccaacgc cgaagtggcc ttttgatcga tcgtcgccaa gggacaataa atgaacgtgg   1080
252   atgtggtagg gtaatttgcc tacctcgctg cttgatcgct tgcaatatgt gcacattttc   1140
253   ctactaccgc tgcttatgca tttcaagcca tgtgatgttg gtatccaata aagtatgtgt   1200
254   agggtttaca cgcaaatgtc tttacacctt gtacgtgtaa gtgttgacaa cgatgaattt   1260
255   cagttcacaa ttaataaata gtataatgga ttcaaaaaaa aaaaaaaaaa aaaa          1314
257  <210> SEQ ID NO: 7
258  <211> LENGTH: 329
259  <212> TYPE: PRT
260  <213> ORGANISM: Hordeum vulgare L.
262  <400> SEQUENCE: 7
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VERIFICATION SUMMARY   DATE: 02/06/2002
PATENT APPLICATION: US/09/674,337A   TIME: 14:15:14

Input Set : A:\55107sequence.txt
Output Set: N:\CRF3\02062002\I674337A.raw

L:13 M:271 C: Current Filing Date differs, Replaced Current Filing Date
L:541 M:341 W: (46) "n" or "Xaa" used, for SEQ ID#:14